National Transportation Safety Board

The NTSB: Enhancing Transportation Safety

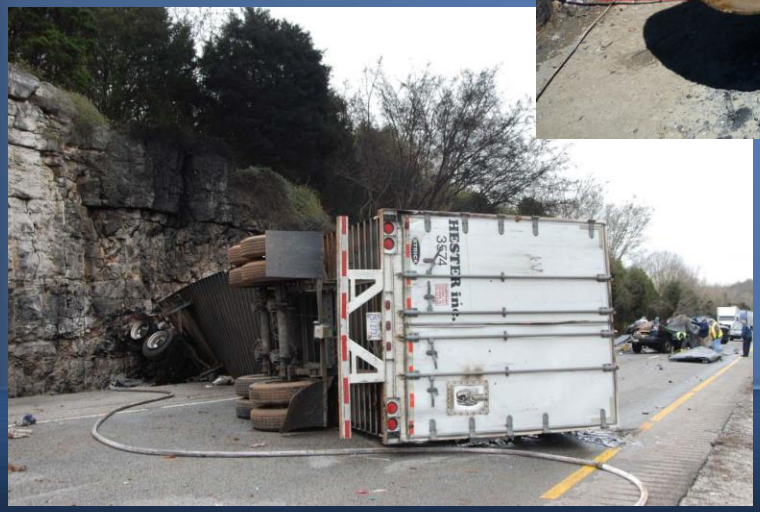
Mark R. Rosekind, Ph.D.
Board Member

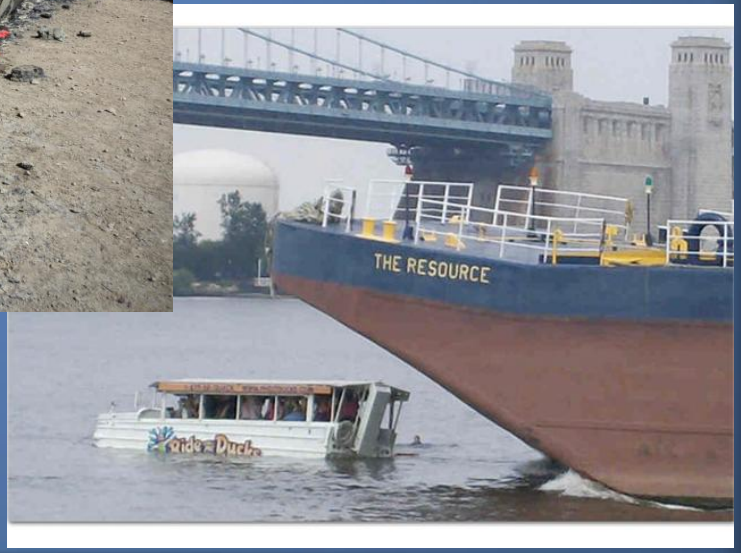
SOCP Fall 2012 Meeting
October 23, 2012

1) determining the probable cause of transportation accidents

2) making recommendations to prevent their recurrence

All Modes



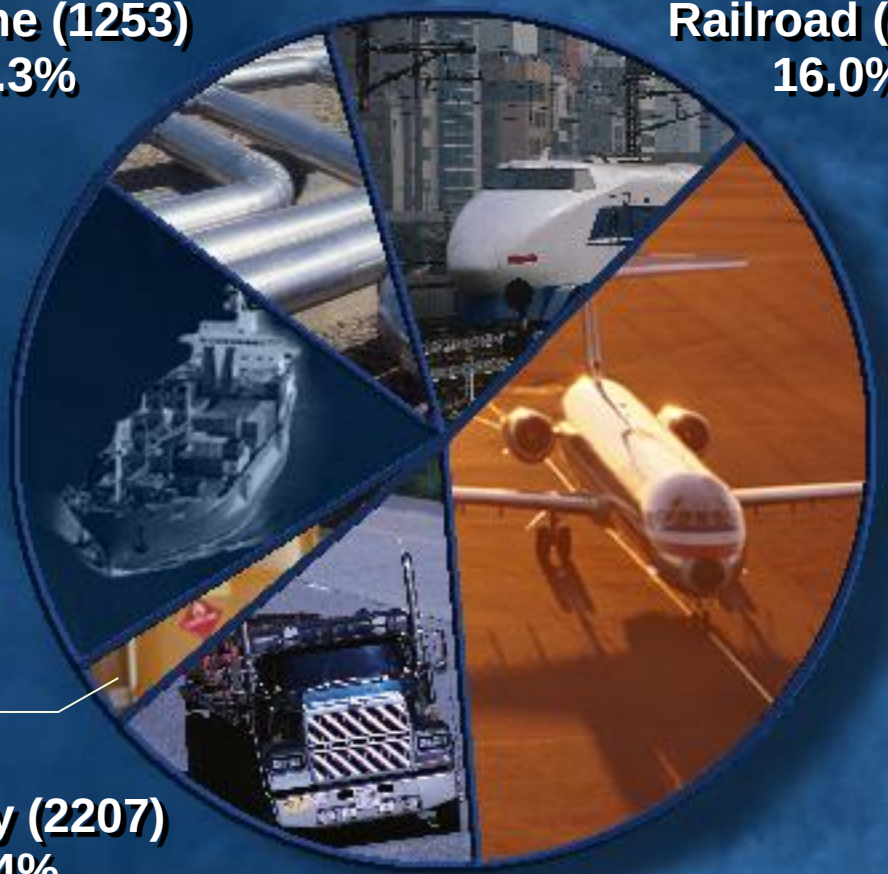


NTSB

Independent Federal Agency: Created in 1967

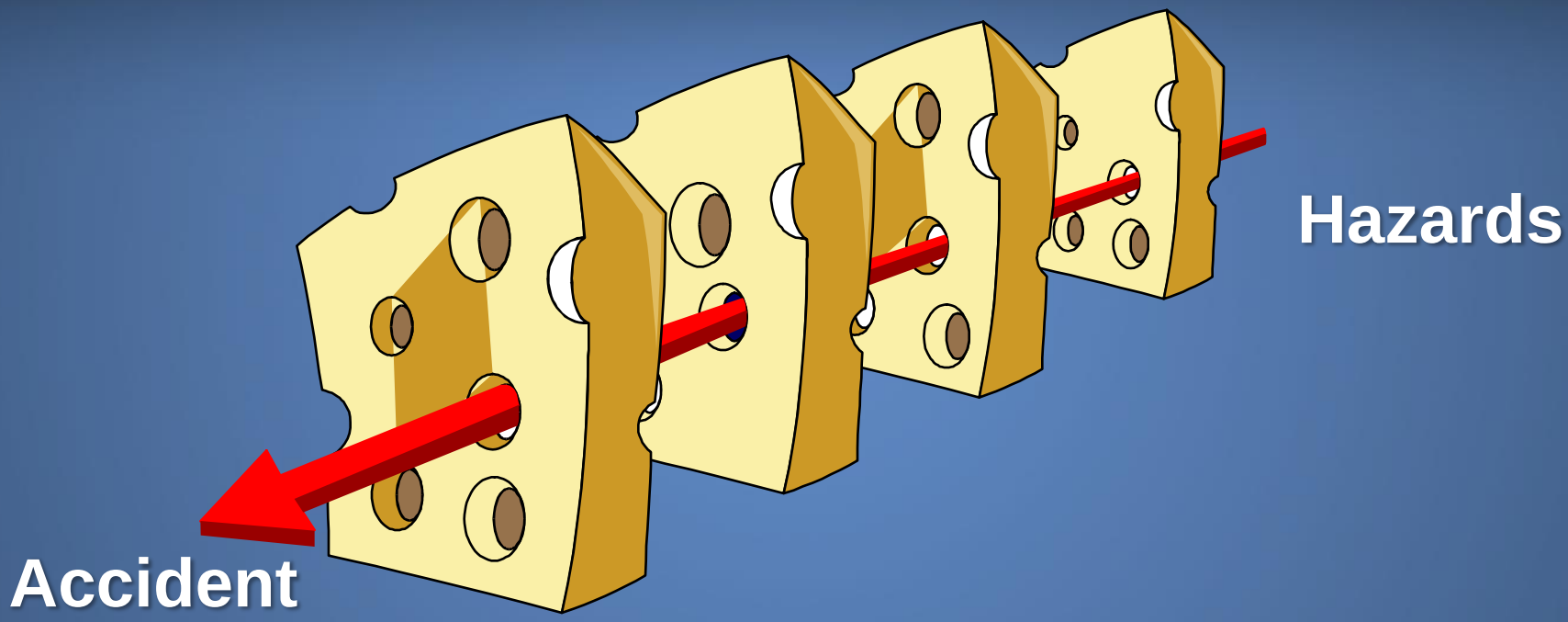
- > 132,000 accident investigations
- 13,500+ safety recommendations
- ~ 2,500 organizations/recipients
- 82% acceptance rate

13,454 Safety Recommendations issued since 1967



Rev: July 1, 2011

“Swiss Cheese” Model (Reason)



Successive layers of defenses, barriers, and safeguards

NTSB Characterized as:

‘moral compass and industry conscience’

NTSB Chairman Deborah A.P. Hersman

NTSB Investigation Process

NTSB Go Team: 24/7/365

- Individual investigator
- Regional/Limited team
- Major launch/Board Member

Key On-scene Events

Organizational Meeting

- Designate parties and party coordinators
- Establish and organize groups

Progress Meetings

- Summarize findings
- Info for briefings

Family Briefings

Press Briefings

NTSB

NTSB Party System

- NTSB selects parties
  (No insurers, claimants, lawyers)
- Bound by rules of engagement
  (Responsive to NTSB direction)
- Verify factual reports written by group chairmen

*"…persons, government agencies, companies, and associations whose employees, functions, activities, or products were involved in the accident and who can provide **suitable qualified technical personnel** to actively assist…"*

Party Member Examples

- FAA (always)
- Equipment manufacturer
- Engine manufacturer
- Airline Pilots Association
- Air Traffic Controllers Union

NTSB Investigative Process

On-scene Investigation

- Organizational Meeting
- Groups and Parties
- Progress meetings
- Media Briefings
- Press Releases

Preliminary Report

- Factual information

Public Hearing

- Fact finding
- Depositions
- Witnesses
- Docket

Board Meeting

- Docket
- Findings
- Conclusions
- Probable Cause
- Safety Recommendations

Final Report

Government in the Sunshine Act

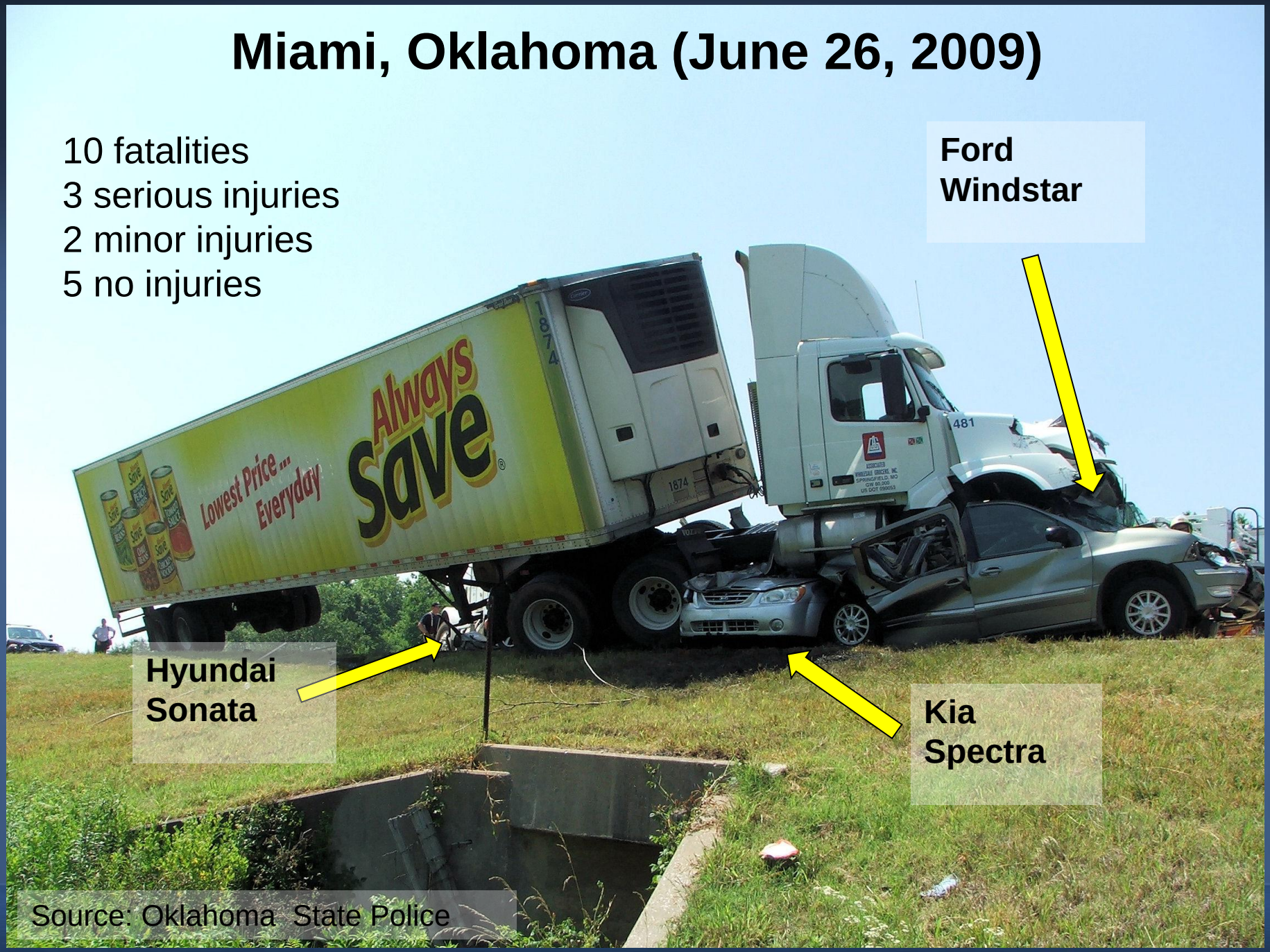
Reno, NV Air Race (9/16/11)

11 fatalities
74 injuries

Fatigue is a safety risk.

Miami, Oklahoma (June 26, 2009)

10 fatalities
3 serious injuries
2 minor injuries
5 no injuries



Source: Oklahoma State Police

Red Oak, Iowa (April 7, 2011)

2 fatalities

NTSB

National Transportation Safety Board

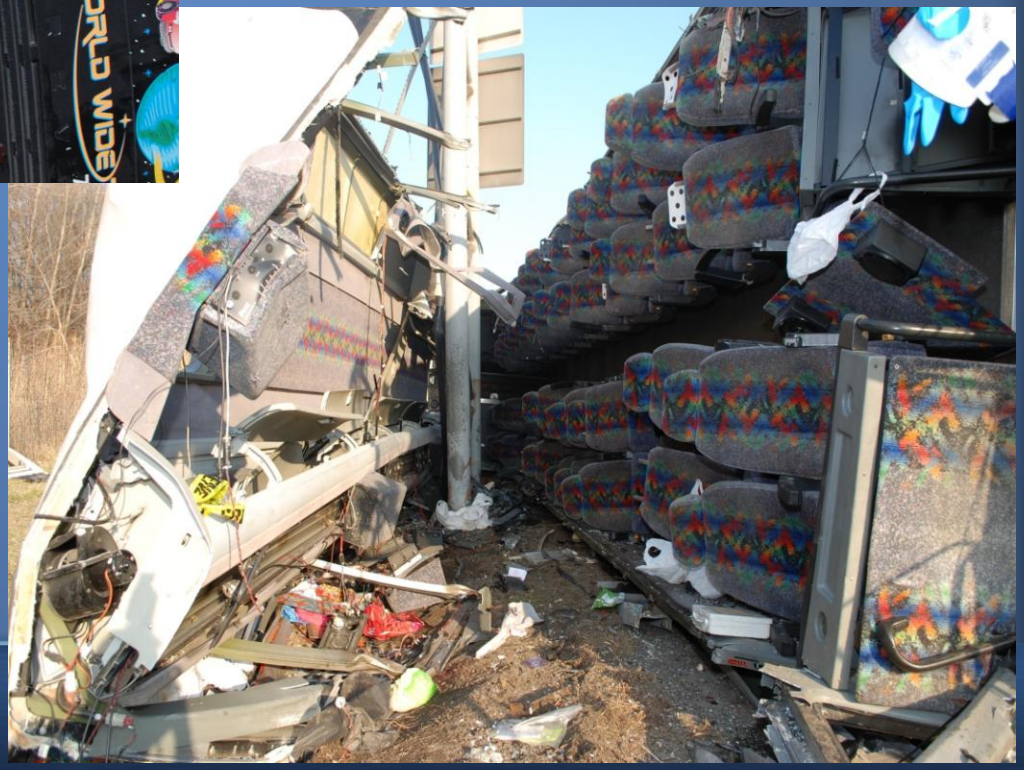
Animation of Accident Reconstruction

Motorcoach Run Off Road-Collision with Bridge Signpost

Interstate Highway 95 Southbound
New York, New York
March 12, 2011

HWY11MH005

‘Bronx Bus’, New York, NY (March 12, 2011)



15 fatalities

17 injuries

Probable Cause

"The National Transportation Safety Board determines that the probable cause of the accident was the motorcoach driver's failure to control the motorcoach due to fatigue resulting from failure to obtain adequate sleep, poor sleep quality, and the time of day at which the accident occurred."

Collision of Tankship *Eagle Otome* with Cargo Vessel *Gull Arrow* and Subsequent Collision with the *Dixie Vengeance* Tow
Sabine-Neches Canal, Port Arthur, Texas
January 23, 2010

Accident Report

NTSB/MAR-11/04
PB2011-916404

National Transportation Safety Board

NTSB

Eagle Otome, Port Arthur, TX

January 23, 2010

NTSB

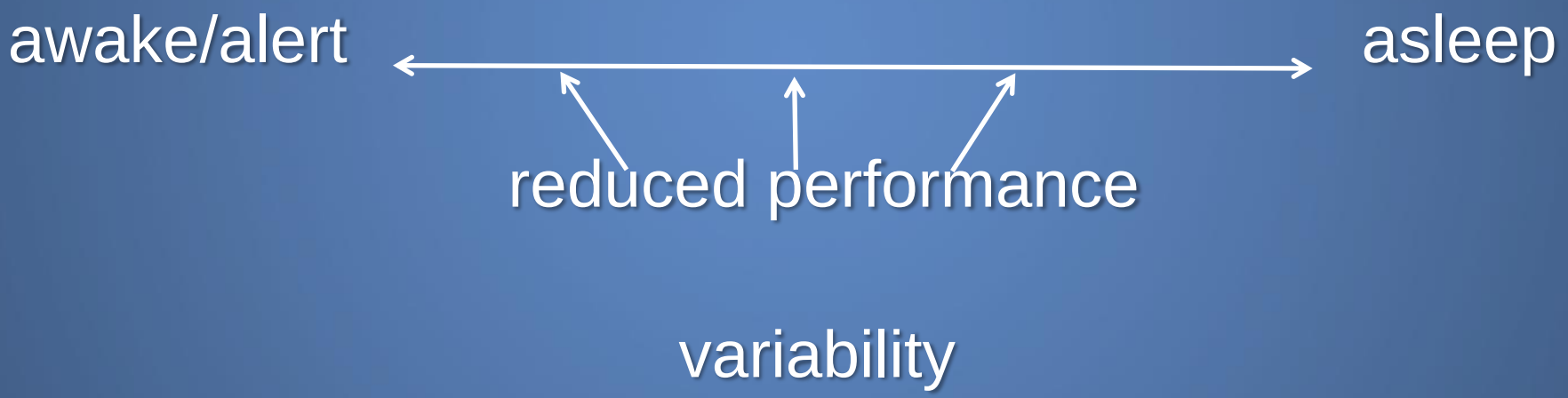
Probable Cause/Contributing Factors

"Contributing to the accident was the first pilot's fatigue, caused by his untreated obstructive sleep apnea and his work schedule, which did not permit adequate sleep;"

Fatigue Risks

Fatigue can degrade every aspect of human capability.

Fatigue Risks



Fatigue Risks

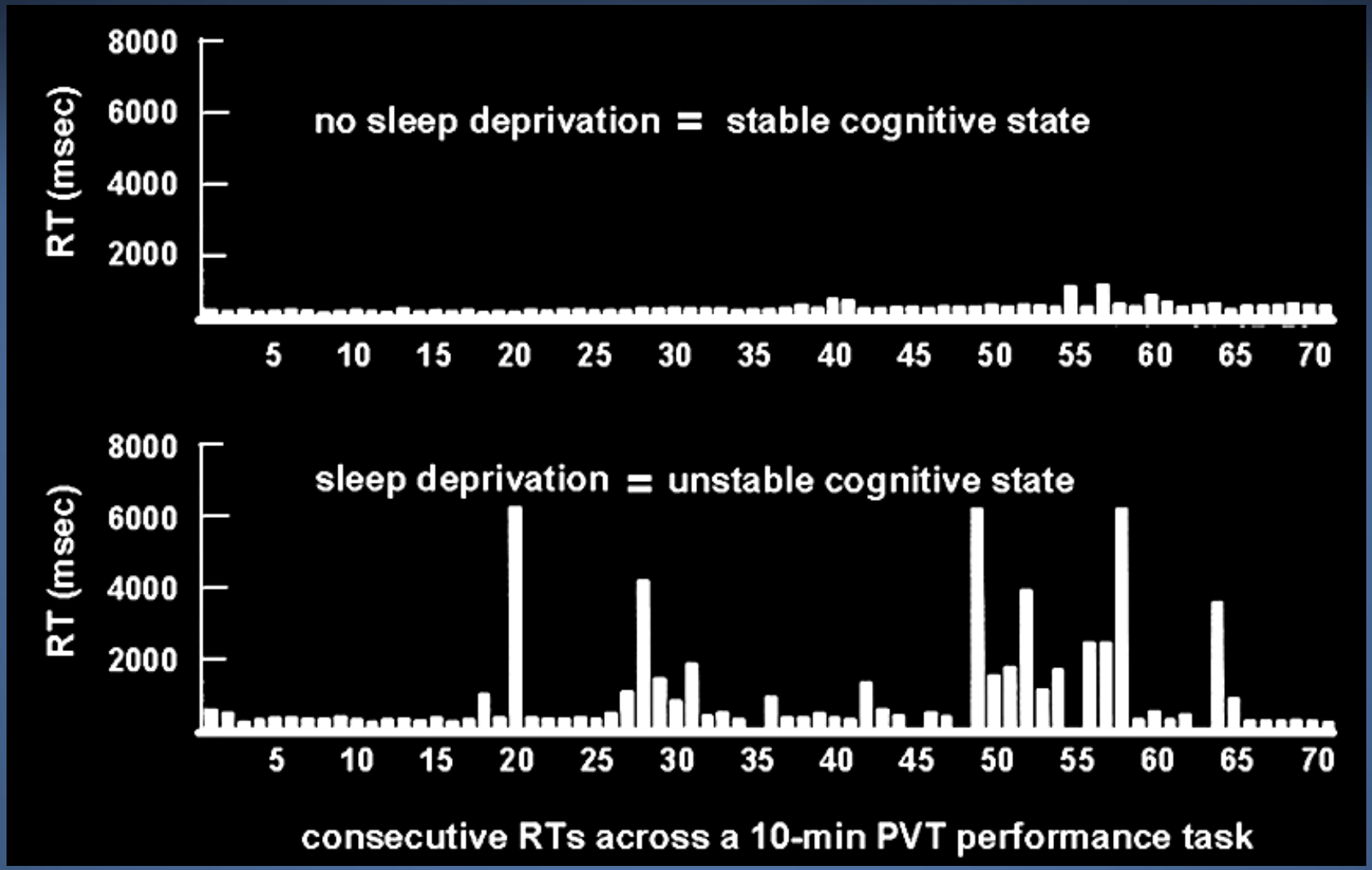
- degraded 20 – 50%+:

  - reaction time
  - memory
  - communication
  - situational awareness
  - judgment
  - attention
  - mood

- increased:

  - irritability
  - apathy
  - attentional lapses
  - microsleeps

Fatigue and Reaction Times



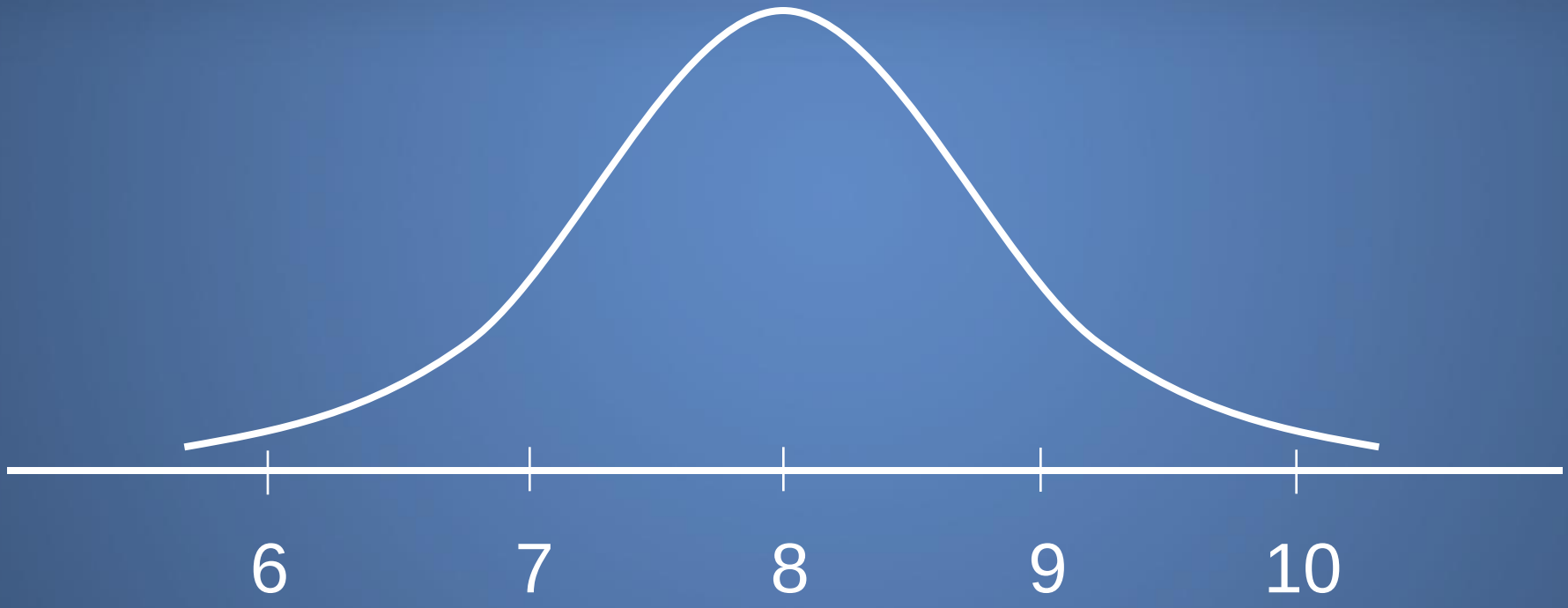
Doran SM, Van Dongen HP, Dinges DF. Sustained attention performance during sleep deprivation: evidence of state instability. *Archives of Italian Biology: Neuroscience* 2001;139:253-267.

NTSB

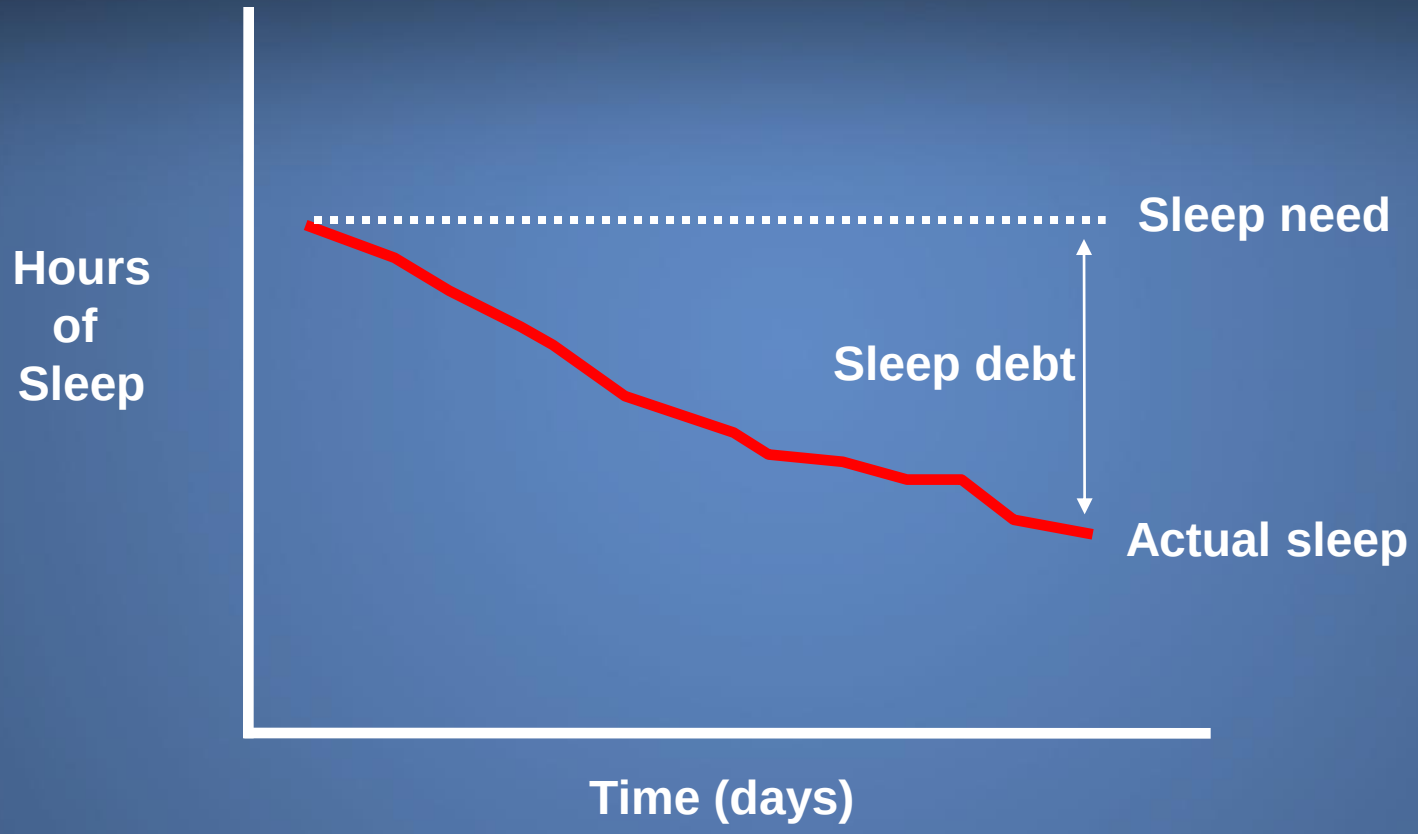
Fatigue Factors

- sleep
- circadian clock
- hours awake
- sleep disorders

Sleep Requirement



Cumulative Sleep Debt



Sleep Need – Actual Sleep = Sleep Debt

Sleep debt grows cumulatively over time

NATIONAL TRANSPORTATION SAFETY BOARD

HOME | NEWS & EVENTS | TRANSPORTATION SAFETY | ACCIDENT INVESTIGATIONS | DISASTER ASSISTANCE | LEGAL | ABOUT

Home > Transportation Safety > Most Wanted List

SHARE

MOST WANTED LIST

A program to increase the public's awareness of, and support for, action to adopt safety steps that can help prevent accidents and save lives.
The following are ten of the current issues.

Addressing Human Fatigue

General Aviation Safety

Safety Management Systems

Runway Safety

Bus Occupant Safety

Pilot & Air Traffic Controller Professionalism

Recorders

Teen Driver Safety

Addressing Alcohol-Impaired Driving

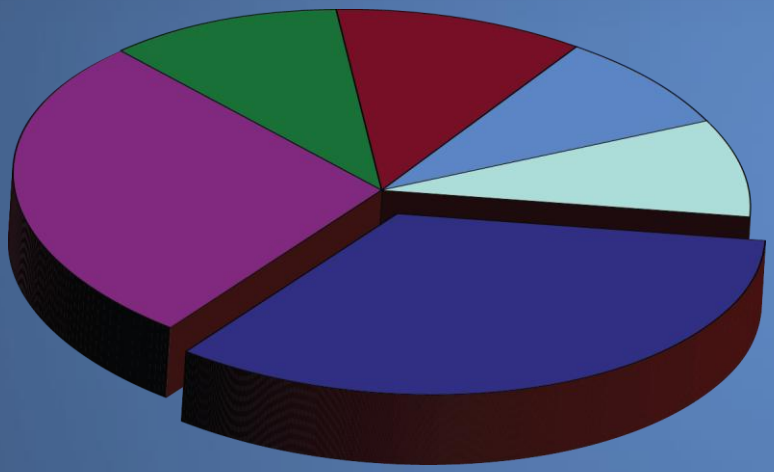
Motorcycle Safety

NTSB

NTSB Recommendations

- MOST WANTED since 1990
- ~200 fatigue recommendations

Complex Issue:



Requires Multiple Solutions

- Scheduling Policies and Practices
- Education/Awareness
- Organizational Strategies
- Healthy Sleep
- Vehicle and Environmental Strategies
- Research and Evaluation

NTSB Fatigue Recommendations: Hours of Service / Scheduling

- Science-based hours of service
- Allow for at least 8 hours of uninterrupted sleep
- Fatigue mitigation strategies in the hours-of-service regulations for passenger-carrying drivers who operate during the nighttime window of circadian low
- Reduce schedule irregularity and unpredictability

NTSB Fatigue Recommendations: Education/Strategies

- Develop a fatigue education and countermeasures training program
- Educate operators and schedulers
- Include information on use of strategies: naps, caffeine, etc.
- Review and update materials

NTSB Fatigue Recommendations: Sleep Apnea/Health Related

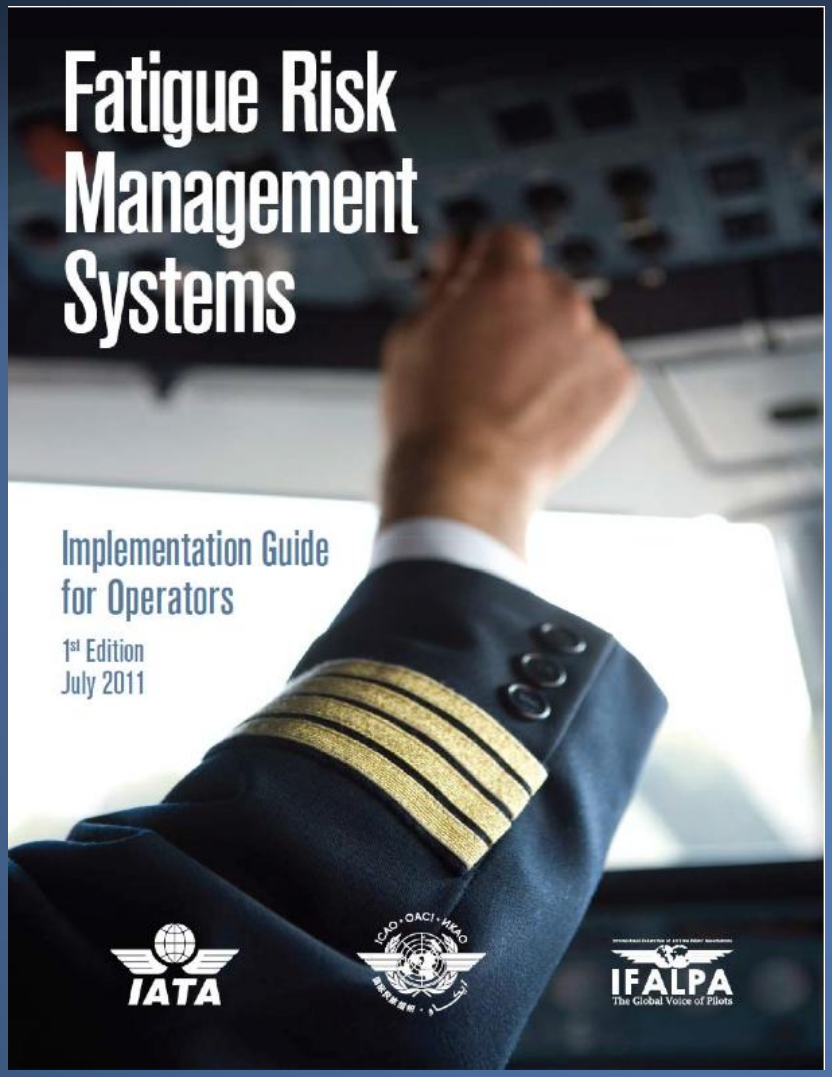
- Develop standard medical exam to screen for sleep disorders; require its use
- Educate companies and individuals about sleep disorder detection and treatment, and the sedating effects of certain drugs
- Ensure drivers with apnea are effectively treated before granting unrestricted medical certification

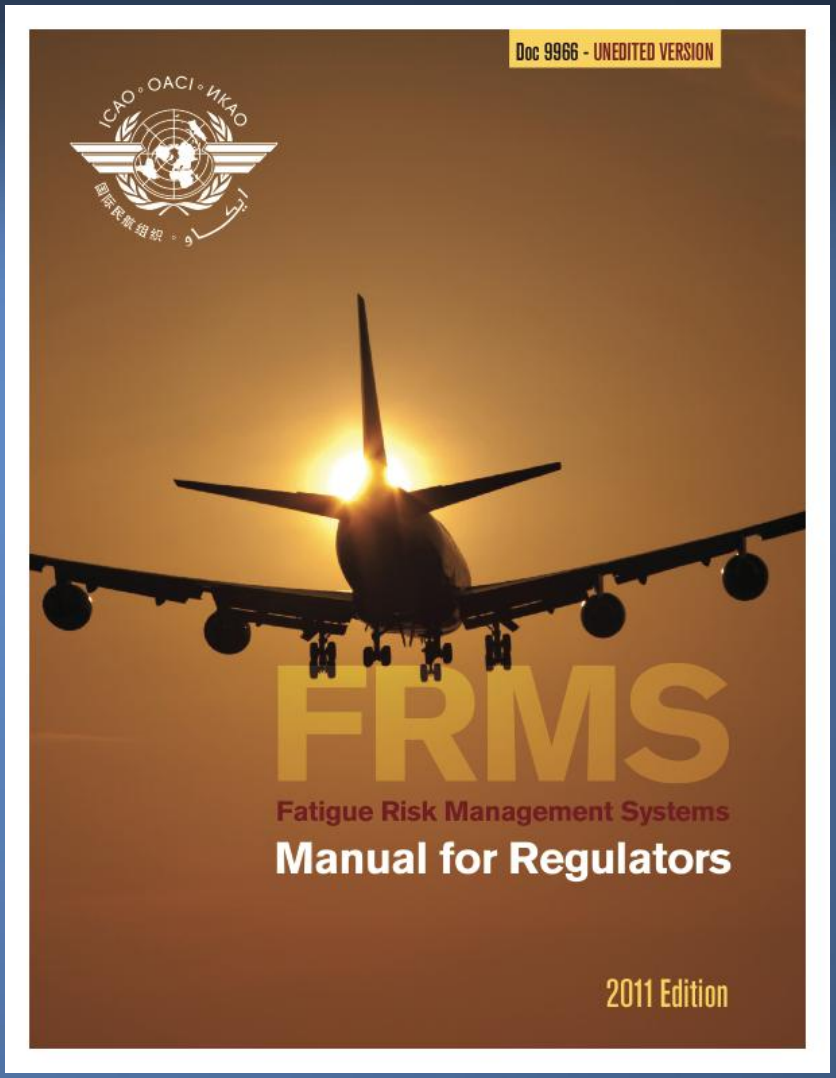
NTSB Fatigue Recommendations: Fatigue Management Systems

- Develop guidance based on empirical and scientific evidence for operators to establish fatigue management systems

- Establish an ongoing program to monitor, evaluate, report on, and continuously improve fatigue management programs implemented by motor carriers to identify, mitigate, and continuously reduce fatigue-related risks for drivers.

Examples





NTSB

NTSB Recommendations: Education/Strategies

- Include information on use of strategies: naps, caffeine, etc.
- No recommendations on specific personal strategies

Changing Safety Culture

Safety goal . . .

→ 0

National Transportation Safety Board